PDI Evaluation Report: Pre-RD Group Conclusions and EPA Comments

Pre-RD Group Conclusion 1 (Executive Summary and Section 2.1):

System Recovery is Occurring Broadly and Rapidly. Multiple lines of evidence from the PDI show that Site recovery is consistently occurring on both localized and Site-wide scales.

EPA Comments:

1. Section 2.1: Systemwide recovery was evaluated quantitatively in the FS and is discussed in detail in FS Appendix D Section D8 (EPA 2016b). The ROD selected a remedial alternative that is reliant on natural recovery and source control, as evidenced by the 84% of the total site area selected for monitored natural recovery (MNR). The statements in this section that assert that the RI/FS and ROD did not consider the rate at which natural recovery would occur do not account for the discussion in the FS Appendix D Section D8.

2. Section 2.1.1, Table 2.1, and Figure 2.1 series: Net deposition over the entire site area or within the ROD SMAs does not account for the dynamics observed at smaller spatial scales. Most of the site (1,008 acres) is neutral and may gain or lose sediment in different seasons or different years. This was further evaluated in the FS (Appendix D Section D8) with an analysis called "Consistency of Depositional and Erosional Processes." EPA performed this analysis again with data from the bathymetry surveys conducted in 2002, 2003, 2004, 2009, and 2018 to incorporate the most recent survey data. Results from the consistency evaluation show that the areas outside of the ROD SMAs (i.e., MNR areas) are, by surface area, 56% consistently depositional, 13% consistently erosional, and 31% neutral or in dynamic equilibrium. By contrast, the ROD SMAs are 30% consistently depositional, 17% consistently erosional, and 53% neutral or in dynamic equilibrium. Consistency of deposition is one line of evidence considered during the FS that suggests that the ROD SMAs, which are predominantly located in the nearshore areas, are less subject to natural recovery and require active remediation. See Appendix D.1 Comments for further discussion.

3. Section 2.1.2, Figure 2.2 series, Figure 2.3, and Figure 2.4: No discussion of uncertainty is included in this section, and the results are not clearly qualified as estimates or lacking statistical certainty. SWACs are estimates of average concentrations, and those developed from the RI/FS data using interpolation methods such as natural neighbor or Thiessen polygons are not directly comparable to the PDI/BL SWACs because of differences in study design. Furthermore, direct comparisons of concentration change over time between proximal samples cannot be considered a quantitative line of evidence. This is due to the heterogeneity in sediment concentrations and the inherent probability of collecting a sample with less contaminant mass than the historical sample (i.e., a 50% probability). Similarities in sediment core profiles is one line of evidence for stability of contaminated areas and is insufficient alone to declare overall stability of the river bed. EPA evaluated temporal change in sediment concentrations with numerous analyses including:

    a. Estimating SWACs at different spatial scales

    b. Calculating rolling river mile concentrations (FS Appendix D Section D10; EPA 2016b)

    c. Estimating temporal change in sediment decision units (SDUs) and proximal samples using a paired-difference statistical method combined with debiasing the RI/FS data using the SRS grid cell areas

    d. Regression analyses using the above debiasing method for the RI/FS data

EPA acknowledges that decreases in contaminant concentrations in sediment are occurring consistent with the ROD CSM as described in Sections 6.2.4 and 10.1.1.6 (EPA 2017a). However, these estimated decreases are predominantly in the MNR areas, as noted in the PDI Report and PDI Report Appendix I, and do not reflect significant decreases in contamination in the ROD SMAs such that the RALs or TADT (ROD Appendix I Figure 28) need to be updated. Further discussion is included in Appendix D.2 and D.3 Comments.

4. Section 2.1.3 and Figure 2.5 series: Different compositing methods were used for the RI/FS and PDI/BL surface water sampling events such that direct comparisons can only be considered qualitative in nature. Furthermore, samples were collected under different flow conditions despite targeting similar flow regimes for the three rounds of sampling. Surface water CULs in the ROD were selected after a review of applicable or relevant and appropriate requirements (ARARs) and represent Federal or State of Oregon statutes or regulations. These CULs are a long-term goal of the selected remedy as discussed in ROD Section 15 (EPA 2017a). See Appendix D.5 Comments for further discussion.

5. Section 2.1.4 and Figure 2.6 series: The previous (2002 and 2007) fish tissue sampling events were designed and conducted differently from more recent studies (2012 and 2018). The 2002 and 2007 fish tissue sampling events composited specimens on a river mile basis either with combined (2002) or separate (2007) sides of the river. Additionally, specimens were either analyzed as whole body or as fillet and offal fractions, with concentrations in fillet or whole body estimated by calculation. These differences in study design preclude direct comparisons and make temporal change evaluations semi-quantitative estimates. Despite the differences in study design, EPA evaluated temporal change in the RI/FS and PDI/BL fish tissue data to develop estimates of the rates of change of contaminant concentrations in smallmouth bass (SMB) fish tissue from 2002 to 2018. This was accomplished through the development of a first order decay mixed effects model that assumes a common sitewide rate of change with differing absolute concentrations; this data handling provides greater statistical power by incorporating all fish specimens into the analysis. This analysis suggests that sitewide fish tissue concentrations are decreasing at rates less than 10% per year. However, the sitewide trends do not represent accurate predictors of temporal change at smaller spatial scales where more variability was observed, likely due to the heterogeneity of sediment concentrations. See Appendix D.6 Comments for further discussion. Furthermore, the ROD acknowledges that the risk-based tissue target levels will not allow for unlimited fish consumption at the site and there is uncertainty due to surface water inputs at a watershed scale (ROD Sections 11 and 15.1.1; EPA 2017a). Consequently, it is premature to suggest that the tissue target levels are unattainable based on one sampling event.

6. Section 2.1.5: This section draws inaccurate conclusions about the potential for the site to achieve the ROD background-based sediment CULs by conflating the Downtown Reach and the Upriver Reach. As described in ROD Section 14.4, there are known sources in the Downtown Reach and EPA is relying on the Oregon Department of Environmental Quality (DEQ) to address these sources (EPA 2017a). Furthermore, the results of the PDI/BL surface sediment and sediment trap data in and near the Upriver Reach are predominantly below CULs and do not suggest limitations for achieving these CULs in the site. See Specific Comment #10 and Appendix F Comments for further discussion.

7. Section 2.1.6: The statement in Section 2.1 that “expanded use of natural recovery is an appropriate part of the Site remedy” is unsupported by the relevant Appendices or sufficient statistical confidence. Consistent with the ROD, EPA expects the SMA footprints to be refined during remedial design with higher spatial density sampling, which in turn will inform whether additional use of natural recovery is

warranted. That said, the PDI/BL surface and subsurface sediment data will be used to inform remedial design sampling, and along with these new remedial design data, may show that the lateral extent of the SMA footprints have decreased.

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Pre-RD Group Conclusion 2 (Executive Summary and Section 2.2):

The System and Sediment Bed are Hydrographically and Geomorphologically Stable. The PDI bathymetry study shows that river flows and sediment bed have remained consistent and stable throughout decades of human activity and episodic natural events. This long-term stability provides confidence that areas of the Site with concentrations of COCs above the ROD cleanup levels (CULs) have not migrated substantially and that in situ remedial technologies are likely to remain stable over time.

EPA Comment:

1. Section 2.2, Figure 2.8 series, Figure 2.9 series, Figure 2.10, and Table 2.2: This section summarizes a set of evaluations performed during the FS to develop the CSM and determine applicable remedial technologies. Evaluations summarized in the PDI Report and performed by EPA confirm the validity of the ROD CSM and conclude that the high concentration areas are predominantly limited to the ROD SMAs. However, this section misinterprets consistency for sediment bed stability and does not base its conclusions on the FS consistency evaluation (Appendix D Section D8; EPA 2016b). The section incorrectly states that only 31 out of 90 PDI/BL subsurface sediment cores have RAL exceedances and does not clarify which RALs were applied for which COCs (77 PDI/BL subsurface cores have ROD RAL exceedances). Additionally, the section provides no empirical evidence for the conclusion that "in-situ remedial technologies are likely to remain permanent and stable." Additional lines of evidence will need to be considered on a site-specific basis during remedial design to definitively demonstrate that in-situ remedial technologies will be suitable for a given area. These include but are not limited to geotechnical slope stability evaluations, vessel/wind/wake modeling, and cap modeling. However, the flexibility in the ROD TADT allows for areas that demonstrate stability and protectiveness with in-situ remedial technologies to select capping over dredging during remedial design.

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Pre-RD Group Conclusion 3 (Executive Summary and Section 2.3):

Surface Sediment Concentrations and SWACs Have Improved. COC concentrations in surface sediments have decreased throughout the Site. This is most clearly illustrated by the statistically significant reductions in spatially weighted average concentrations (SWACs) of total PCBs since 2004 at multiple spatial scales.

EPA Comment:

1. Section 2.3: Comparisons of surface sediment concentrations and SWACs at various spatial scales are considered estimates due to the differences in study design and limitations of statistical analyses such as interpolations. See General Comment #2, Specific Comment #3, and Appendix D.2 Comments for further discussion. EPA's evaluation of SWACs at various spatial scales suggest that concentrations have decreased since the RI/FS due to natural recovery and source control. However, the occurrence of site SWACs lower than those in the ROD is not a sufficient line of evidence alone for reevaluating the ROD RALs. Decreases in SWACs are driven predominantly by decreasing COC concentrations in the MNR areas, which account for approximately 84% of the total site area and receive greater sediment deposition than the ROD SMAs. Section 2.2 of the PDI Report acknowledges that the highest surface sediment concentrations in the PDI/BL data were measured in the ROD SMAs, thus "indicating stability of the high concentration areas." Additionally, the ROD MNR areas and RALs were selected based on multiple lines of evidence evaluated during the FS (FS Appendix D) including initial and post-construction target SWACs, deposition and erosion rates, consistency of depositional and erosional processes, sediment grain size, anthropogenic factors, subsurface to surface sediment concentration ratios, and wind and wake generated waves (EPA 2016b). Lastly, decreasing sediment concentrations over time is consistent with the ROD CSM, as described in ROD Sections 6.2.4 and 10.1.1.6 (EPA 2017a).

Pre-RD Group Conclusion 4 (Executive Summary and Section 2.4):

Upstream Conditions Support Updates to Background. PDI data show that concentrations in the D/U Reach continue to exceed ROD sediment CULs and fish tissue targets for a number of the focused COCs, including total PCBs, DDx, and dioxins and furans. The PDI data demonstrate that the ROD CULs and risk-based tissue targets for those focused COCs cannot be realistically achieved and sustained.

EPA Comment:

1. Section 2.4, Table 2.3, Table 2.4, Table 2.5, Figure 2.7 series: The PDI/BL data from the Upriver Reach do not support the conclusion in this section that the ROD background- based, 95% upper confidence limit (UCL) sediment CULs are unattainable. In surface sediment, 90% of the Upriver Reach detected concentrations were less than the focused COC CULs. Sediment trap sediment concentrations from the river mile (RM) 16.2 transect, which is in the Downtown Reach, were all less than CULs for total polychlorinated biphenyls (PCBs), total PAHs, and dichlorodiphenyltrichloroethane and its derivatives (referred to collectively as DDx) during all PDI/BL sampling rounds. The polychlorinated dibenzo-p- dioxin and furan (dioxin/furan) congeners had some results with minor CUL exceedances, which is expected due to the higher percentage of fine-grained material in sediment traps compared to surface sediment. Suspended sediments in surface water represent potentially settleable material, and their effect cannot be quantitatively evaluated due to the absence of a fate and transport model for the site. As detailed in ROD Section 6.6.2, sediments captured in sediment traps indicate "the effect of erosion and resuspension of bottom sediment, the presence of current sources, or both" and that "approximately 82% of the suspended sediment load passes through the site" (EPA 2017a). Therefore, the Upriver Reach surface sediments are the most representative sampling strategy for understanding reasonably attainable surface sediment concentrations in the site. Furthermore, the average and 95% UCLs described in this section utilize data from the Downtown Reach. This is incompatible with the ROD, which has defined the Downtown Reach as an active cleanup area under the purview of DEQ. The ROD did not estimate fish tissue background concentrations due to insufficient data; therefore, the risk-based fish tissue target levels in the ROD are not cleanup standards but will be used to inform institutional controls such as fish advisories. Equivalence testing was performed by EPA with the PDI/BL data as per the baseline sampling and LTM plan (EPA 2017b). Results from this evaluation confirm that sediment and fish concentrations in the site are statistically higher than, and therefore not equivalent with, those in both the Downtown Reach and the Upriver Reach. Progress toward attaining remedial action objectives (RAOs) will be assessed during the five-year reviews at which point the background-based CULs may be adjusted up or down as appropriate pending future LTM data. See Appendix D.2, D.4, D.5, D.6, and F Comments for further discussion.

Pre-RD Group Conclusion 5 (Executive Summary and Section 2.5):

Fish Consumption Risk is Reduced Relative to Previous Estimates. PDI SMB tissue sampling shows significant reductions in concentrations relative to historical tissue data and a corresponding significant decrease in the risk from fish consumption since the Baseline Human Health Risk Assessment (BHHRA) for the RI/FS.

EPA Comments:

1. Section 2.5.1, Table 2.6, and Figure 2.11 series: Providing an update to the publicly reviewed and EPA-approved baseline human health risk assessment (BHHRA; EPA 2016a) is outside the scope of the PDI/BL sampling program as defined in the ASAOC and PDI work plan (Geosyntec 2017). The PDI/BL sampling

program was not designed for risk assessment and is not an agreed upon data use. As stated in BHHRA Section 2.0, "data needs for the BHHRA were identified through the data quality objective (DQO) process described in Section 7 of the Programmatic Work Plan (Integral et al. 2004)" (EPA 2016a). Integral et al. (2004) developed DQOs, sampling locations, and sampling numbers for the BHHRA following EPA's risk assessment guidance (EPA 1991). The data use objectives and DQOs for the PDI/BL sampling program outlined in the PDI work plan and PDI QAPP, respectively, do not discuss risk assessment.

Despite risk assessment not being an agreed upon data use, EPA assessed the exposure assumptions and risk estimates in the PDI risk update. The estimated reductions in cancer risk and noncancer hazard are inflated due to incorrect application of the PDI/BL data to the 2013 BHHRA exposure assumptions (EPA 2016a) and because of multiple issues with the "up-to-date exposure assumptions," rendering them invalid and inadequate for decision-making at the site. Sediment exposure point concentrations (EPCs) with the PDI/BL data are not directly comparable to those from the RI/FS due to differences in the DQOs, sampling locations, and sampling numbers between the two studies. The BHHRA evaluated consumption of multiple species of resident fish (SMB, common carp, brown bullhead, and black crappie) for recreational and subsistence fishers, not just SMB. Concentrations of chlorinated organic compounds such as PCBs, DDx, and dioxins/furans were measured up to an order of magnitude higher in carp compared to SMB during the RI (EPA 2016a). The PDI risk update only considered SMB tissue concentrations as this was the only species collected during the PDI/BL sampling. The fish consumption rates in the BHHRA for the recreational fisher were based on a regionally relevant survey in the Columbia Slough (Adolfson Associates, Inc. [Adolfson]1996), whereas the PDI update relied on a study from Idaho (Buckman et al. 2015) without justifying its applicability to the site. The subsistence fisher consumption rates in the PDI risk update (EPA 2014a) do not state that they replace rates from the previous national survey used during the BHHRA (EPA 2002). Tribal fish consumption rates and diet composition in the PDI risk update are based on surveys from three tribes (Polisar et al. 2016a, 2016b; SRC 2015), two of which are not regionally appropriate and relevant to the site area. The 95th percentile fish consumption rate from the one regionally appropriate and relevant tribe (Nez Perce) in the PDI risk update was 233.9 grams per day (g/d), which is greater than the 175 g/d assumed in the BHHRA (Polissar et al. 2016a; EPA 2016a). The BHHRA tribal fish consumption rate and diet composition was developed from a survey of regionally relevant and appropriate tribes (Columbia River Inter-Tribal Fish Commission [CRITFC] 1994). See Appendix G Comments for additional discussion.

2. Section 2.5.2 and Table 2.7: Risk assessment, either in the site or the Downtown Reach and Upriver Reach (referred to collectively as the D/U Reach), is not an approved data use in the PDI work plan (Geosyntec 2017). Furthermore, EPA disagrees with the exposure assumptions and risk estimates in the PDI risk update, as detailed in Specific Comment #11 and Appendix G Comments. The ROD risk-based fish tissue target levels are not cleanup standards but will be used to inform institutional controls. Additionally, the appropriateness and scientific validity of the RI/FS background evaluations and the ROD background-based sediment CULs was formally disputed and decided on March 24, 2015 (AR Doc # 500011627) and December 27, 2016 (AR Doc # 100036161). The suggestion in this section that background sediment values were not appropriately calculated is contrary to the decisions in the site AR. Compliance with sediment CULs will be measured in the top 30 centimeters (cm) of sediment (i.e., surface sediment), which represents the biologically active zone as detailed in ROD Section 14.2 (EPA 2017a). The RI/FS background evaluations measured COC concentrations in surface sediments in the Upriver Reach, which were then used for background-based sediment CULs where appropriate.

3. Section 2.5.3: EPA's evaluations of the PDI fish tracking data confirm rather than undermine the validity of the 1-mile home ranges previously estimated by an Oregon Department of Fish and Wildlife (ODFW) study (Pribyl et al. 2004) and applied in the BHHRA. EPA disagrees with the conclusion that the mechanistic food web model (FWM) used in the RI/FS needs to be updated. See Appendix D.7 and H Comments for further discussion. Risk- based sediment CULs were selected in the ROD only in instances in which these values were higher than background concentrations. The PDI risk update does not address uncertainties identified in the BHHRA and is an insufficient update of human health risks at the site.